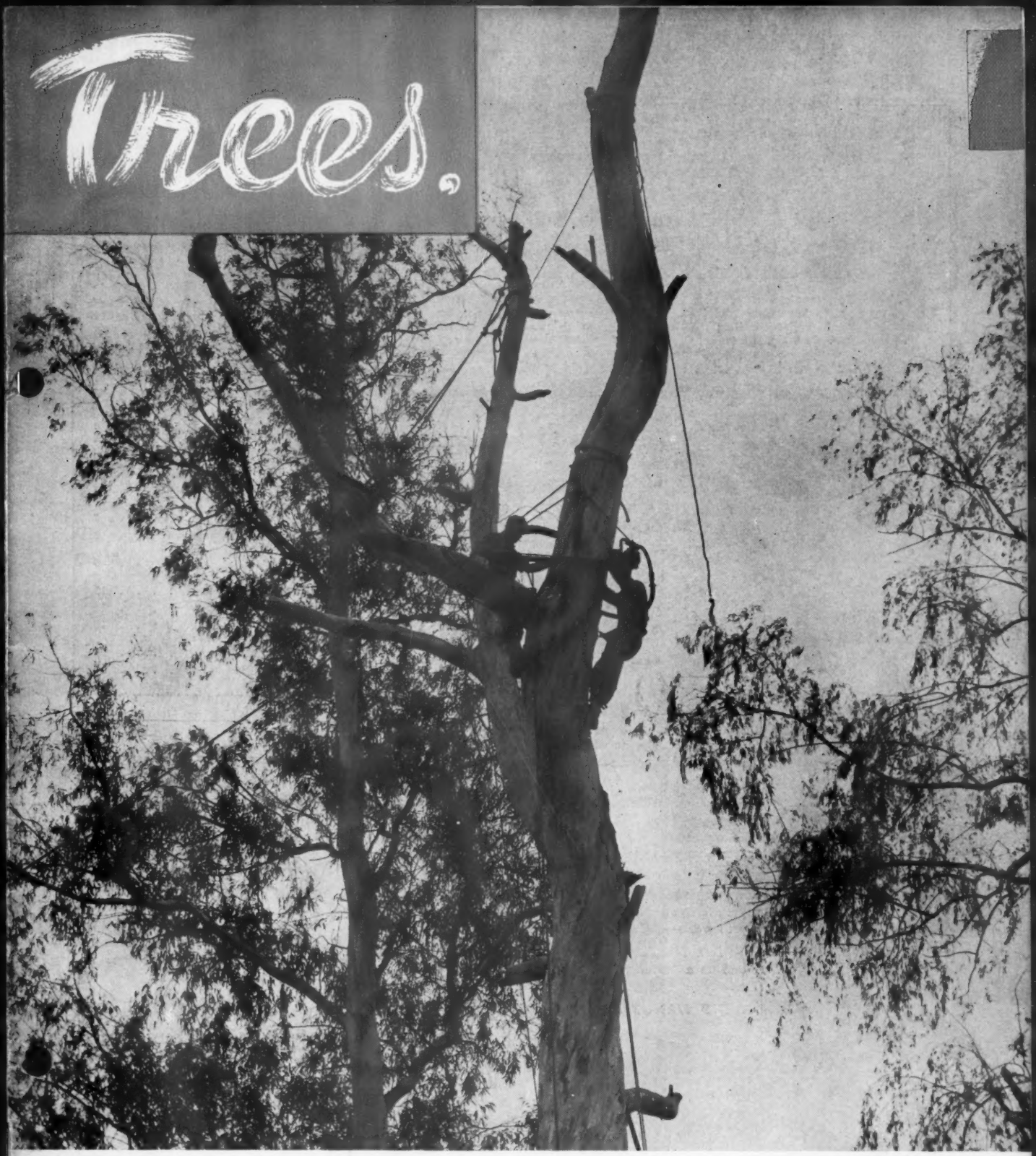
Trees.



Air Chain Saw Used in Felling Huge Eucalyptus (Story Page 8)

Cleveland, Ohio, Selected for 23rd National Shade Tree Conference

The Movements of Sap In Trees — ***D. T. MacDougal***

The Chain Saw Takes to the Air — ***Ross O. McIntire***

September-October, 1946 *The Journal of American Arboriculture* Vol. 7—No. 1

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Vol. 7 Bi-Monthly No. 1

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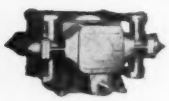

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ALONG THE WAY With . . . EDW. SCANLON

● *HIYA COUSINS. While you're STILL INTERESTED how about TAKING A GANDER at the TWO-COLUMN GEM RIGHT NEXT to this and learn the SCHEDULE FOR COMING ISSUES. You'll recall I OPINED early this year (WHERE DO I GET THIS VERNACULAR—I ain't a Texan. DOC BLUME does all the TEXASING WE NEED) we'd have FOUR NUMBERS IN '46. Well! LOOK OVER THERE AND GET THE SCOOP.*

● *A note from the ENGLISH NURSERY firm of S. BIDE AND SONS at Farnham, Sussex, GIVES THE INFORMATION that "elms are PRACTICALLY EXTINCT, (in England) so far as YOUNG PLANTS ARE CONCERNED, having not proved satisfactory BECAUSE OF DISEASE."*

● *A new phase of ARBORICULTURAL CONSULTATION is being probed by J. E. BIXLER and JAMES CHAISSON OF NATICK, MASS., operating as the SOUTHERN CROSS FORESTERS. They are "consultants to the Gas Industry." GOING GOOD, TOO, according to J. E. B.*

● *Sorry to hear that RICHARD ST. BARBE BAKER, founder of the world renowned reforestation organization "MEN OF THE TREES" is ill at his home in PUNCKNOLL, ENGLAND. Mr. Baker is also the EDITOR OF A MAGAZINE "TREES," journal of the "MEN OF THE TREES." A SPEEDY RECOVERY to you.*

● *CALIFORNIA was well and ably represented at the BOSTON National Shade Tree Conference. FRED ROEWEKAMP PIERRE MILLER, ROGER SOHNER, and GEO. K. FREEMAN being the reps of the SUNSHINE STATE.*

● *The BOSTON CONFERENCE was a double anniversary for ORVILLE SPICER and his charming wife, ESTELLE. August 28th was their 26TH WEDDING ANNIVERSARY. Many more happy ones, KIDS.*

● *TREES ENLISTED two super subscription salesmen at the Conference in the persons of DAVE POE and "NERO" ROBERTSON, both Bartlett reps. Haven't had all the returns from the CIRCULATION DEPT. YET, so am not sure whether to retain their services for the CLEVELAND CONFERENCE or not. Work hard, lads.*

● *J. R. HOPKINS, JR., is the new owner of the HARVARD TREE SURGEONS at Canandaigua, N. Y.*

● *Says WM. HAWKEY OF THE HAWKEY ORGANIZATION, SADDLE RIVER, N. J., "enclosed is year's sub . . . if future issues are as good as the first, I HAVE MADE A GOOD BARGAIN." Thank you —we hope to come UP TO EXPECTATIONS . . . Ed.*

● *M. L. DAVEY, JR., who recently became president of the DAVEY TREE EXPERT COMPANY on the REGRETTED DEATH of his FAMOUS FATHER, "M. L." to so many, made his FIRST APPEARANCE at the N. S. T. C. Don't MISS ANY MORE, BRUB!"*

● *SORRY WE WON'T have any "MICROSCOPE" this issue, PAT THE PIRONE is going to loaf for a month or so, just a "SHORT VACATION," but will bring THE VITAL STATISTICS up to date in the FEB. ISSUE. Have a GOOD TIME, CHUM, while we POOR PEOPLE SLAVE.*

● *You SHOULD HAVE SEEN the movies BILL SPEED had of a ROBOT TREE REMOVER. We HOPE TO have the ROBOT IN PERSON at CLEVELAND IN '47.*

The **next issue of TREES Magazine** will be **February, 1947.** This will be the end of the dislocation caused by the war. **A regular schedule** of six issues per year will prevail starting in **February, 1947.** We had a **heck of a time** from Pearl Harbor to now, but, who hasn't, at least **TREES** is still around. **Thanks** to everyone for being **so patient.**

● *The FAMOUS TREES in front of ST. PATRICK'S CATHEDRAL and RADIO CENTER in NEW YORK could sure stand some ARBORICULTURAL MASTER MINDING. They looked VERY "PORE" the day I saw them. It's A SHAME.*

● *JACK ROBINSON and EARL STILLSON, the personality kids of the HARDIE MFG. CO., had a bad time trying TO GET A TABLE at the N. S. T. C. banquet. FINALLY SETTLED for a hamburger at "ULCER GULCH" around the corner.*

● *Make your HOTEL RESERVATIONS EARLY (not for a couple of weeks yet) for that CLEVELAND NATIONAL SHADE TREE CONFERENCE. President Irish ("I only want one term") says it's going to be the SUPER DUPEREST DUPER SUPER of them all.*

● *Met a LOT OF NICE PEOPLE in BOSTON, many of whom had formerly been VALUED CORRESPONDENTS. DR. BROMLEY, GEORGE CODDING and DICK FENSKA of the BARTLETT TREE EXPERT CO. DR. J. B. HOUSER of Wooster, O. DR. MALCOLM McKENZIE of Mass. State College. DR. DON WYMAN of the Arnold Arboretum, and KEN FLAIG of Ft. Wayne.*

● *Oh yes! Did you notice the HANDSOME EFFECT the "SLIGHTLY GRAYING" sideburns give to JACK KENEALY?*

● *Only had ABOUT AN HOUR to show the LITTLE WOMAN NEW YORK so we went up on the EMPIRE STATE BLDG. That's a view, IT WAS CLEAR, and we even saw the OLD GIRL out in THE HARBOR—but not GRANT'S TOMB.*

● *That annual "BREAKING IN" party MONDAY nite—VANCE SHIELDS' annual AFFAIR, should have been held IN THE GRAND BALLROOM. The guy WHO ISSUED the invites didn't MISS MANY.*

● *ROSS FARRENS, the FLORIDA TYCOON, or is it just HURRICANE, attended his FIRST CONFERENCE. He must have paid TOO MUCH ATTENTION to business tho, HE WENT HOME as PRESIDENT of the NATIONAL ARBORISTS' ASSOCIATION.*

● *ELLIOT ROOSEVELT'S recent book is in the BEST TRADITIONS of the family —BAD TASTE. But, he will probably make a nice CHUNK OF DOUGH on it—ANOTHER FAMILY TRADITION.*

● *Soon, OH SO SOON, I'll be seeing those WHITE SPOTS in FRONT OF MY EYES. And I don't MEAN D.T.'s. That SNOW stuff! Haven't seen any FOR SEVENTEEN YEARS. Wonder how I'LL LIKE IT—not good PROBABLY.*

● DON'T EVER MISS seeing DURAND-EASTMAN PARK in ROCHESTER, N. Y. —*or JAKE GERLINGS* (the Supervisor thereof) PICNIC COOKING. Stopped there after the BOSTON CONFERENCE with CARL FENNER, JIM DACEY, SAM HEER, F. H. BRUSHMILLER and ROY STECK.

THAT PARK is a MASTERPIECE, and so was the CHOW JAKE FIXED.

● *PAT SLAVIN, head man of the ROCHESTER PARK DEPT., was a CORDIAL HOST and seemed to GET A KICK out of us COUNTRY BOYS seeing a GRADE A PARK and STREET TREE SYSTEM.*

● *I HAVE DONE a lot of RAVING ABOUT "fastigiate" trees (GILBERT SKUTT take notice) but I HAD NEVER SEEN the superlative way they WORK ON STREETS until I HIT ROCHESTER.*

You can CALL ME "FASTIGIATE" from now on—but DON'T MISS ROCHESTER.

● *But, to GET BACK to that CHOW OF JAKE'S. Honey-dew WATERMELON, Lincoln HYBRID CORN, delicious franks (REAL MEAT), blueberry pie, YOW! They had to LIFT ME AWAY from the table—and all this in a BEAUTIFUL SETTING in that MASTERPIECE OF PARKS—Durand-Eastman.*

● *Thanks JAKE and PAT for a SWELL TIME.*

● *Meeting AN OLD FRIEND, TREES, in an ARMY HOSPITAL in CALIFORNIA was a PLEASANT SURPRISE to BOB McALISTER, arborist of GREAT FALLS, MONT. Bob has just BEEN DISCHARGED and is resuming HIS PRACTICE. Is also going TO DIG UP SOME NEW REASERS for TREES. WE HOPE.*

● *DON'T FORGET that CHANGE OF ADDRESS notice. It HELPS GET TREES to you faster.*

● *INDIANAPOLIS was WELL REPRESENTED at the Boston Conference. AL DE SHANO and H. N. ENGLEDOW being the reps.*

● *To look at HENRY W. MOORE (the "W" is for WADSWORTH, which adds up to a TREE EXPERT CO., in SOUTH BEND.) You would never think the LUG WRITES POETRY (TREES-6-4-18). Hope he DIDN'T GET ANOTHER INSPIRATION passing his namesake's IGLOO in CHARLESTON.*

● *I wonder if KENNY FLAIG AND HIS WIFE would like TO HAVE ME make HOTEL RESERVATIONS for them for the CLEVELAND CONFERENCE? I sure FLUBBED THAT eh! Chum.*

● *Here's a GOOD ONE clipped from a local sheet: In New England A SMALL BOY now MENDING IN AN EMERGENCY WARD has learned ABOUT RUSSIA by PATTING A ZOO BEAR.*

● *RAY DIETZ, Supt. of Parks at COLUMBUS, was telling about the HUGE JOB OF REMOVING the 20,000 ELMS that have FALLEN VICTIM there to PHLOEM NECROSIS. He'll have a STORY ABOUT IT in a COMING ISSUE of TREES.*

● *The Supt. of Parks at AKRON, DICK BARNHART, is interested in a pow-wow to DISCUSS NEW STREET TREE SPECIES. So are others. HOW ABOUT a get-together of OHIO, MICHIGAN, and any other CITY FORESTERS AND PARK SUPERS. real soon. Let's have SOME OPINIONS. Huh!*

September-October, 1946 *The Journal of American Arboriculture* Vol. 7—No. 1

EDWARD H. SCANLON, Editor 27

Temporary Address: 2478 Putnam St., Toledo 10, Ohio

"No place is complete without trees. A home without trees is charmless; a road without trees is shadeless; a park without trees is purposeless; *a country without trees is hopeless*"

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Cordially Yours

OUT WITH FREE ESTIMATES

Up to the present time Arboriculture has been plagued with a bogey titled "free estimates cheerfully given" or some other obviously untrue statement in kind. No man in his right mind, operating a business with all its attendant overhead and headaches, can afford to be cheerful about dispensing freely of his time, in most cases to a chiseler who will then turn around and employ a cheap competitor.

Too many of the public buy "price" and not "quality" or "service" when they shop around. So, if they can obtain a number of free estimates they are in a better position to satisfy their craving for the lowest possible price. Why should tree men help in this practice, which certainly does not add stature to the profession. When you call a doctor or go to his office you expect to pay, and do so. It's no different with an arborist, both are selling the same commodity, knowledge. Except, of course, in the case of the doctor, the shopper is sick and therefore scared, so the deal is much easier to make.

However, it would seem that with economic conditions as they are today there might be at least some effort made to eliminate this mark of quackery from the tree picture. Estimate charges can be included in the bill if the job is obtained, or they can stand, as the individual operator sees fit, but very definitely some effort should be made now, there will never be a better time, probably for many years to come. We would like to have some comment.

HASTEN BREEDING AND SELECTION

How much longer are we going to wait before we get busy on the job of seeking the trees of the future? Are we going to wait until most of the major cities of the midwest and east are robbed of their greatest asset, their trees, before we act?

We have two tragic stories before us, with another building rapidly—the plane tree loss in Philadelphia, the current elm holocaust in Columbus, and the serious threat to elms in Indianapolis.

It looks like we are fiddling after the horse has been stolen. Certainly if there is an organization in the country that should be interested in circumventing the extension of such devastation it is the National Shade Tree Conference. This is the logical group to lead a fight for funds in the Congress to institute a program of control, and what is probably of more importance, the selection and breeding of hardier, more resistant species of trees for street and ornamental purposes.

We've got to get out of the present rut; even if we shout, no one could hear us, the rut is too deep. The only remedy

now is action. Some of us may laugh at the doings of others, but someone has to do something, even if they should commit the "cardinal sin" and make a *mistake*.

What is going to be the reaction to other street and ornamental trees in Columbus, where already 20,000 American elms have succumbed to the Phloem Necrosis disease. Just one factor should be worth study, what will be the reaction on the soil with the removal of this huge shading and humidifying element.

Street tree species used for the past hundred years, have not for the most part stood the test of modern cities. Here we need to test new species and propagate individuals that show signs of resistance to compaction, smoke, drought and other adverse factors that make existence difficult for urban trees. By developing better street trees we will automatically provide a much more ideal lawn and ornamental tree, for the rigors of life are not nearly so great on such sites.

We would like to see President Irish of the National Shade Tree Conference and President Farrens of the National Arborist Association "do something" about this during their incumbency. No other thing they could do would be more constructive. We must seek the trees of the future.

Park Executives In St. Louis

The 46th annual convention of the American Institute of Park Executives will be held in St. Louis, Nov. 17, 18, 19 and 20.

The reason given for the late date this year is hotel accommodations. While the Jefferson Hotel will be the official headquarters and scene of all activities, no guaranty is offered that all delegates can be accommodated there. Reservations will be handled through the Housing Bureau, American Institute of Park Executives, 910 Syndicate Trust Bldg., St. Louis 1, Mo.

The program has not been completed but will stress "Park Operations and Equipment." P. B. Baumes, Commissioner of Parks and Recreation for St. Louis is general chairman of the local committee.

Southern Conference This Month

It should be beautiful in Asheville, N. C., on Oct. 16, when Chairman Curtis May calls to order the Southern Chapter of the National Shade Conference. It will be a three day meet.

Principal speaker at the banquet, the evening of the eighteenth, will be Dr. Richard P. White, secretary of the American Association of Nurserymen.

Charles F. Irish, new president of the National Shade Tree Conference, has been invited to attend.

The Big Tree, botanically known as the Sequoia GIGANTEA, now grows only in the Sierras of California between 4,000 and 8,000 feet elevations. It is distinguished from the Coast Redwood, or sequoia SEMPERVIRENS, which grows on the California and Oregon coasts.

He dropt his match when he lit his cigar,
And it fell in a bunch of grass,
And then he went on to shoot his b'ar
In the distant mountain pass.
The blaze shot upward, the wind it riz,
The fire spread over the patch,
And the melted buttons they found was his,
The fellow who dropt the match.

Burned forests build no homes for veterans. Please be careful with fires.

Liberty Hyde Bailey Speaks for United Horticulture

Wade Park Manor in Cleveland, Ohio, will be the scene of an epochal "first" conference when Dr. Liberty Hyde Bailey addresses a group of horticulturists assembled from all corners of the land to discuss the formation of an organization designed along the lines of the Royal Horticultural Society in England. It is proposed that the new institution be known as "United Horticulture for the United States."

Host to the pioneers will be Arnold M. Davis, director of the Cleveland Garden Center and a staunch mover in the organizational plans. The meeting will convene Oct. 8th and continue for three days. Chairman for the three day meeting is C. Eugene Pfister, president of the Men's Garden Clubs of America.

The proposal is to unite all trade, scientific, professional and lay horticultural organizations in the United States. They would not lose their individual identities but rather would pool their efforts towards elevating appreciation for and participation in horticulture in general.

Going hunting? Then remember that eternal vigilance with fire is the price to a successful vacation.

Archibald Enoch Price
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Wm. Solotaroff—Tree Planter and Author

Famous Arborists Series No. 6

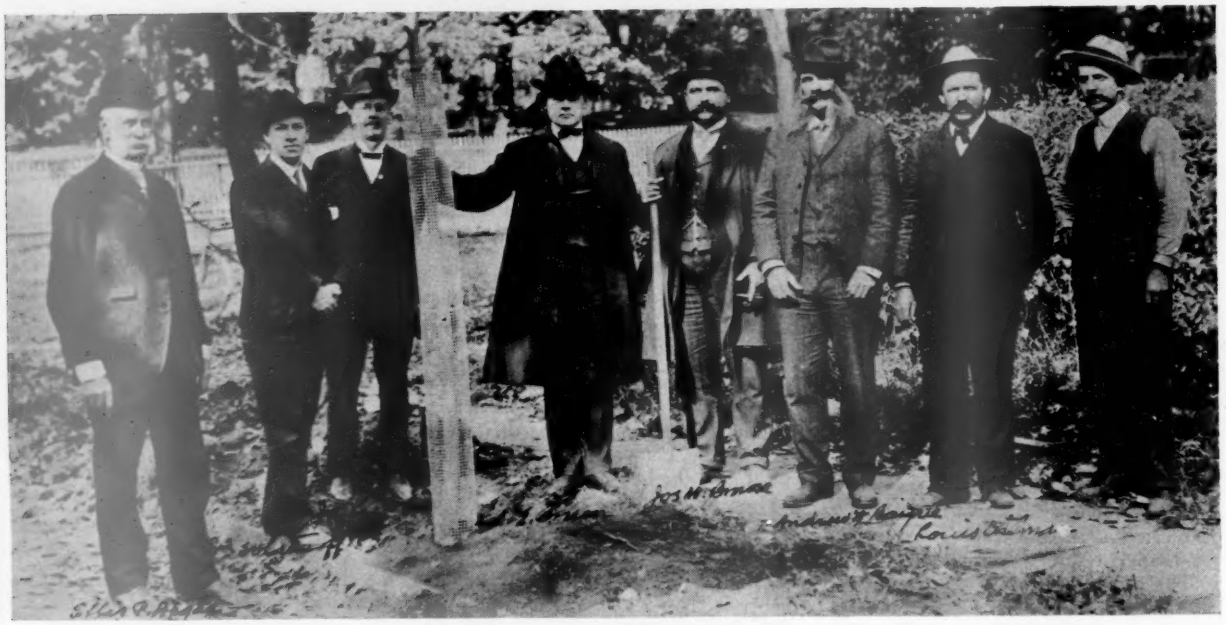

Photo courtesy Harry E. Turner, Sec'y., Shade Tree Commission, East Orange, N. J.

This picture is believed to be the only one in existence of Wm. Solotaroff (2nd from left) author of "Shade Trees In Towns and Cities." It shows him at the beginning of his career, as the leader of the shade tree movement in America, planting the first tree for the newly organized Shade Tree Commission of East Orange, N. J., Oct. 19, 1904. Figure on left is Professor Ellis A. Apgar distinguished botanist and educator, professor of botany at Trenton Normal College and advisor to young Solotaroff.

By Carl Bannwart
Supt. Shade Tree Bureau
Newark, N. J.

The hot metal is in the press of the mint but a moment, but the impress of that moment is stamped on it for a long time. So is it with the tree-planter, particularly along city streets. He may plan and plant only a few years but the impress of his work if it is well done, may outlive him for a century. William Solotaroff was the Superintendent of the Shade Tree Commission of East Orange, N. J. He served the city from the Fall of December, 1904, to 1911, when he relinquished his task on account of illness. He died in 1921.

The city of East Orange had a population of 25,000 and 58 miles of streets when he began his work there in 1904. Its population now numbers 72,000, with 73 miles of streets, which is to say 146 miles of frontage. Eleven thousand trees graced its streets when he began in 1904 and 15,000 when he left in 1911. Today there are 30,000 trees along its public thoroughfares.

There are miles of beautifully shaded streets in East Orange which have the impress of Solotaroff's careful planning and planting. The first planting cost the citizens $2.50 per tree including subsoiling, wire guard, stake and guaranty. The patient growth of 40 years has enhanced the value of these trees so that no home owner in his senses would now part with any one of them for $500. The evidence of Solotaroff's work will long endure. The serried ranks of maples, lindens, oaks and planes are garlands of excellence of the city. In addition to his actual planting, he and his commissioners set a pattern of procedure that has commended itself to the citizens and set the precedents of a necessary part of the municipal administration on a high plane.

When New Jersey communities entered upon their tree planting career in the early years of the 20th Century, the conditions were ripe for this new movement. Many communities had the same problems: the older trees planted by private initiative had been neglected, new insect pests were appearing; linemen and leaking gas mains took their toll without effective restraints or authoritative representatives of the trees to compel amends. The communities were not prepared to cope with these conditions because they had not worked out a definite pattern of control either of tree planting or tree protection. As the problems became more acute, leading citizens searched the statute books and found the New Jersey Shade Tree Statute drawn by Frederick W. Kelsey of South Orange. Shortly, several communities of Essex County availed themselves of the powers of this statute which had been enacted by the New Jersey legislature in 1893. (Revised in 1915, chapter 325).

This law provides for a Shade Tree Commission of "three freeholders who shall serve without compensation, and who shall have the exclusive and absolute control and power to plant, set out, maintain, protect and care for shade trees in any of the public highways" of the municipality. A later statute gives the same commission exclusive control of the city parks. The status of street trees is raised by the appointment of a Shade Tree Commission for they stand forth now before all people as the special wards of a municipal department specifically created to protect them. *An innovation of the statute is the authority of a Shade Tree Commission to assess the cost of new plantings against the property in front of which the trees are set out.* This assessment becomes a lien.

(Continued on Page 13)

Irish and Cleveland for 1947

Breaking a precedent of twenty-two years the Board of Governors of the National Shade Tree Conference at the recent meeting in Boston bestowed a well deserved and hard earned honor on the brow of Charlie Irish by electing him president of the conference for the coming year. They also voted to hold the twenty-third annual meeting in the new president's home town, Cleveland, Ohio.

Prior to this meeting only scientific members had ever been elevated to the presidency. In fact, the constitution formerly dictated that this should be the rule. The choice was very popular with the 700 delegates who assembled at this, the finest in a long series of notable meetings.

The Boston conference was a tribute to the tireless energy of Ed Higgins, who served as general chairman. The program ran on with punctual regularity and the highlights delighted the largest group ever to attend one of these meetings.

Boston weather was unusually "unusual" for the meeting, being in the high seventies, with only a light rain to cool the second day.

Field demonstrations of equipment were held at Arnold Arboretum Wednesday afternoon, August 28. New blower types of sprayers and several makes of conventional high pressure sprayers were demonstrated. Other equipment exhibited and operated were tree movers, chain saws, a brush disposal machine, pneumatic tools and method and materials for protecting trees from lightning.

Thirty-three commercial companies exhibited materials available to arborists in caring for shade trees. Educational exhibits were presented by the Massachusetts Horticultural Society, Massachusetts Agricultural Experiment Station, U. S. Bureau of Entomology and Plant Quarantine, and Arnold Arboretum.

Charles F. Irish, newly elected president, National Shade Tree Conference.

A. Robert Thompson, of the National Park Service, summarized the information collected by the National Shade Tree Conference Lightning Struck Tree Survey. It was found that 96 per cent of the trees struck were standing alone, were even with, or higher than other nearby trees. Approximately 50 per cent of the Oaks struck by lightning died as a result of the strike. A higher percentage of elms struck by lightning lived than was the case with oaks. No evidence was found that any tree is immune to being struck by lightning. Properly installed lightning protection systems have given 100 per cent protection. There is no record of a properly protected tree being damaged by lightning.

The papers on the program were all of a crucial nature, being devoted to matters of much concern to arborists, and were presented by nationally known scientists and arborists. These papers will be available to members in the proceedings which are published each year several months after the meeting.

The new president has announced that he will strive to enlarge on the program, launched by the conference last year, of encouraging research in shade tree problems in the various State experimental stations throughout the country. The first collaboration in such a program resulted last year in the presentation, by the conference, of an award to Dr. J. Cedric Carter for his splendid work on the "Wetwood of Elms." Mr. Irish was a prime mover in effecting this award and he wishes to expand this valuable work in the interests of arboriculture.

Mr. Irish was born in Cleveland Sept. 4, 1891, and launched his tree preservation company, The Charles F. Irish Co., in 1912. Except for twenty-six months spent in the army in France during World War I, his entire working life has been devoted to the trees of his home town. He is credited with having brought to the attention of Dr. Curtis May, in 1930, the first tree known to have Dutch Elm disease in the United States.

The dates for the twenty-third conference at Cleveland have not been announced, but the officers would appreciate an expression from members on the feasibility of holding the meeting after Labor Day in order to miss the huge holiday travel crowd that prevails at that time. They would like to have your thoughts on the matter.

Farrens Announces Plan for New N. A. A.

The new president of the National Arborist Association, elected recently at Boston, Ross Farrens, arborist of Jacksonville, Florida, has authorized publication of his first statement as head of the organization. This plan should have a far reaching effect in the interests of the individual and the profession throughout the nation and it is felt that many new members will be attracted by this action program.

Mr. Farrens' statement follows:

During the year, 1946-1947, the National Arborist Association is taking a step of great interest to those who make a living in the tree business. It has long been apparent that an organization of commercial tree men banded together would be desirable and beneficial to themselves and the profession as a whole. In eight years much progress has been made and help given to individual members. But the Association has been on a part time basis.

At the Boston meeting the members present voted to double their dues and to go on a full time basis by establishing an office and hiring a full time salaried Executive Secretary. The name of the Executive Secretary has not been officially announced at the date of this writing, but will be in the near future.

It is expected that after a few months of preliminary organization the National Arborist Association will function as a much more important factor in the tree business than in the past.

Members will be able to get information and help not previously available. Efforts will continue to improve the class of work being done, to help the tree man make more money and to promote a better feeling among good competitors.

Although none of them has been definitely agreed upon, some of the many suggestions offered on how the new Of-

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The Chain Saw Takes to the Air

By Ross O. McIntire
Principal Tree Surgeon
Los Angeles Park Department

Recently the Division of Forestry of the Los Angeles City Park Department was given the job of removing one of the largest Eucalyptus trees in Southern California, which due to the attack of Armillaria was becoming a hazard to public safety, a tree 9 feet in diameter, approximately 140 feet tall, forking 10 feet above the ground into three major trunks averaging 46 inches in diameter 2 feet above the crotch, with only one major branch under 70 feet.

Removal was further complicated by the presence of high tension lines, telephone aerial cables, fences and landscaped areas which made it necessary to cut into small sections and lower everything above 30 feet at which height the "stump" could be pulled.

Not only does the size of the tree and the hazards involved in its removal make this job of interest, but the fact that for the first time a pneumatic chain saw was used to do all major topping makes it worthy of comment.

In preparation for removal, the tree was stubbed back to 90 feet in height, leaving only the 3 major upright trunks, the top cut on one of which was 18 inches in diameter, which was the last cut made with the use of a hand saw. The most upright trunk was then guyed to a nearby tree to be used as a boom for lowering. A snatch block was suspended from this boom at a point approximately 90 feet above the ground. The cable from the power winch of our truck was run through a snatch block attached at the base of the tree and through the block at the top of the boom from there to the portions to be lowered.

After this was completed we were ready to bring into use a pneumatic 5 horsepower 3 foot chain saw for cutting the remaining portions for lowering. In order to lift the saw into position, a small sheave was attached to the trunk approximately 3 feet above the proposed cut and a line passed through the sheave and tied into the cradle which held the saw in a horizontal position, then pulled up to two tree surgeons who were suspended by ropes in such position as to be able to operate the saw. (See cover picture.) The saw was used either right side up or upside down, whichever was the more convenient due to the position required for cutting.

The cuts were made to the point where the power winch could complete the break. The air hose, which was tied to the tree below the cut, to relieve the operators of its weight, was disconnected and the saw lowered to the ground. Then the operators, after rerigging air hose and sheave for next lower cut, descended to the ground or swung back to the other trunk to be in the clear when the section was broken free. This precautionary measure was necessary due to the fact that sections being lowered weighed from one ton to a ton and a half. During all operations the air pressure was disconnected, as a matter of safety, excepting while the saw was in actual use.

This procedure was followed until the first and second forks were at the height for pulling. The snatch block was then removed from the gin and attached to the adjacent tree and the same procedure followed in lowering this fork.

In all, thirteen cuts were made with the pneumatic saw, cuts varying from 20 inches to 30 inches in diameter. The first such cut was made at a height of approximately 60 feet by two operators who had never had any previous experience with a chain saw of any model.

Cutting lateral of 18" root. Sections were cut out of root to allow room for further digging.

This cut was 20 inches in diameter and was made in 25 minutes, by which time the operators were convinced that the chain saw not only had saved them at least one hour of back breaking labor, but was adaptable to aerial work with no great hazard. We averaged 10 minutes per cut for rigging saw and air hose, making the total sawing time for the 13 cuts, 5 hours and 50 minutes. It is estimated that the use of the pneumatic chain saw saved a total of 16 hours and 40 minutes for a crew of seven men in topping operations.

During all these operations the chain saw came into use in another way. A gasoline model was used by the ground crew to cut up into firewood lengths all pieces as they were lowered to the ground. By the time the tree was ready for pulling, all this wood was cut up and hauled away from the job.

While the pneumatic chain saw was a great time and labor saver in aerial work, it proved its versatility in cutting the roots. All roots were exposed, and the pneumatic saw put into use cutting this anchorage. Eight roots were over 18 inches in diameter, and their laterals, and nine roots over 12 inches in diameter and their laterals were cut with the same saw used in topping operations, without resharpening the chain.

The pneumatic saw is particularly adapted for this work due to the fact that it can be used in any position, requires very little clearance, and the exhaust of the motor keeps the chain free of dirt and grit.

All roots were cut in a total of four hours. It is estimated that by hand tools the cutting of these roots would have taken at least ten hours with three men.

After the stump was pulled to the ground, the gasoline models were again put into use cutting up the tree. In one hour and thirty minutes with two gasoline models, 17 cuts averaging 34 inches in diameter were made.

While our methods of suspending the saw and arranging its use can be improved with experience in the use of the power saw for aerial work, this job has proved that the pneumatic chain saw has a definite place in the removing and topping of large trees.

In all it is estimated that the use of the pneumatic chain saw saved a total of 158 man hours at the average hourly rate of $1.25 and 22 truck hours at $1.00, making a total saving on the entire job of $219.50.

Regarding the Oriental Plane, Pliny tells us that "no tree whatsoever defends us from the sun in summer," and Evelyn speaks of it as "the incomparable and shady Platanus, that so beautiful and precious tree which we read the Romans brought out of the Levant."

The Movements of Sap in Trees

By D. T. MacDougal
Carnegie Institution of Washington, Carmel, Calif.

The beginner in botany learns in an early stage of his studies that watery solutions of soil-compounds pass into the roots and are conducted upward in the woody tissues of stems to the leaves; that with a deficient supply wilting ensues; that carbon dioxide from the air is brought into combination with material in the sap to form sugars and proteins which are conducted downward and to all growing tracts of the plant. These simple facts have been known for more than two centuries, but identification of the mechanism by which the necessary enormous quantities of material are lifted and carried into position in tall trunks and crowns of trees has come but slowly. The most important contributions to knowledge of the process have been made since the announcement by Dixon and Joly in 1894 of the cohesion theory of the ascent of sap. The movement of liquids in conduits was shown to be caused by purely physical forces without the participation of living matter.

When it was seen that no magical or vital forces participated in causing the flow of solutions and that some features of it could be illustrated by assemblies of apparatus progress in solving the problems connected with translocation was greatly facilitated.

While the conduits and other structures concerned in the flow of sap are constructed by living cells, one does not need to be an expert anatomist to understand the hydrostatic system and its action. Some knowledge of the principal feature of nutrition and growth is necessary however as a basis of comprehension of a system of streaming movements which transport nutritive material from the place of absorption or synthesis to regions of use and consumption.

A laborer who would undertake to carry the necessary amounts of liquid solutions of building material up a ladder to the levels at which used by a large redwood or pine day after day would work overtime in the spring and early summer. Gravity would make his task a weary one.

The Hydrostatic System

The movements of sap take place in conduits with such small bores that gravity is without measurable effect in the living tree. The power necessary is not expended in lifting the sap, but in overcoming the friction encountered in passing through the minute openings in the walls of the tracheids; this friction

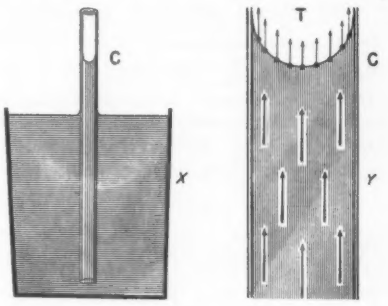

Fig.1

Fig. 1. Illustrating the mechanics of evaporation from the minute cups of water in moist leaf-surfaces with resulting upward movement of sap.
X. Diagram showing curved surface (C) of a cohesive column of water pulled upward by adhesion to the walls of a tube with small bore.
Y. Enlargement of the upper part of the column of water with arrows (T) indicating detachment of particles of water from curved surface by vaporization. Losses from the surface are instantly and continuously replaced by upward movement from below. The "pumping" action is capable of lifting sap to a height of a thousand feet.

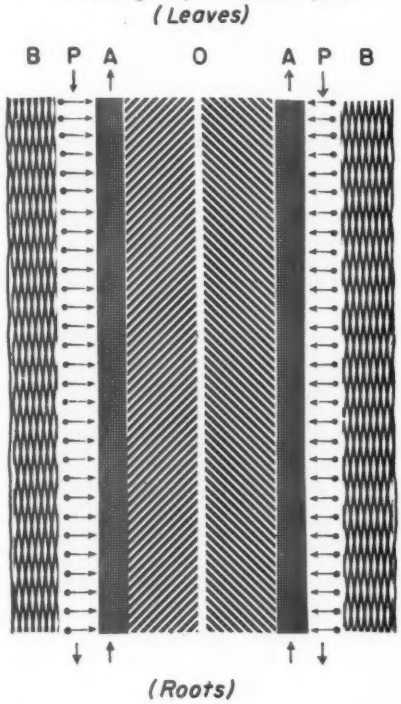

Fig.2

Fig. 2. Schematic design of the flow of liquids in a trunk of Monterey pine. O, central woody cylinder the tracheids of which contain chiefly resins and atmospheric gases. A,A, outermost three or four most recently formed layers of wood in which sap moves upward; short horizontal lines indicate rays, the conduits of which connect outwardly with sieve tubes and inwardly with the woody layers. P,P, Arrow pointed symbols indicate stream of leaf-products downward and inward through the rays.

could be very nearly equivalent in horizontal and in vertical trunks. In the operation of such a system the cohesive properties of water are of fundamental importance. The thin threads of water are in fact stronger than steel threads of the same dimensions, consequently a pull on any part of the meshwork is instantly communicated to the entire system as if it were truly made of metal.

Physical Features of the Leaf-pumps

Pulling power is generated wherever the threads of the hydrostatic system terminate in exposed moist cell-walls. This occurs chiefly in the leaves. An understanding of this action may be gained by observations of the column of water in a thin glass tube standing in a dish as in Fig. 1, X. For example, water rises to a height of about 3mm in a bore of 6mm and 6mm above the level of the contents of the dish in a bore of 0.4 or 0.6mm.

It will be noted that the top of the column of water is not a level surface, but that it rises on the walls of the tube to form a cup the interior of which may be characterized as a parabola. The surface of this cup has properties as well-defined as those of the cohesive threads in tracheids. This may be seen if a thin splint of wood is thrust down the tube to touch the curved surface; a small drop of water will come away when the splint is withdrawn. Instantly, and much too speedily to be seen the deformed liquid surface of the cup is restored by water pulled up from below, in exact duplication of happenings in the numberless exposed ends of threads of the hydrostatic system.

The similitude is further illustrated by Fig. 1 Y, in which particles of water are being vaporized from the surface of the water in the minute cups in leaf-cell-walls, as goes on continuously at varying rates, with an equivalent replacement by sap.

While the hydrostatic system is continuous through all moist cell walls and the tension or pull is co-extensive, actual steaming occurs only in the elongated conduits of wood and bast. On the other hand it is to be noted that sap does not ascend in all of the woody cells. The main flow is in the three or four most recently formed seasonal layers of pine and redwood. All layers of a willow furnish conduits while the chestnut is reputed to carry a stream in the outermost and most recently formed layer of wood only, a matter which has not been recently and adequately tested.

Structure of the Conduits in pine and redwood

No long passages or vessels are pres-

(Please Turn Page)

ent in these two trees; the tracheids may be visualized as minute organ pipes with tapering overlapping ends through which the bordered pits afford communication, not as though a simple orifice but through perforations in a closing membrane of a size that permits the passage of the black particles of India ink and of the graphite in a lubricant known as aquadag.

Similar communications through the lateral walls of the tracheids with each other and with the thin sheets of conduits and living cells of the rays at all levels exist. The rays in turn open into sieve tubes, and other cells of the phloem outside the cambium and interior to the bark. The conditions described permit streaming or free flow after a pattern noted below.

The Incomplete Circulation in a Tree

The streaming movements described above may be visualized as an incomplete "circulation", or a "whirlpool". A small fraction of ascending sap which is deflected returns by a downward movement in the phloem and inwardly through the rays into the main current carrying leaf-products gained in the cycle.

The presence of such substances in the main stream, that is in the upwardly moving sap in the wood has puzzled many investigators, especially those who have carried experiments in translocation with sections of stems, branches, and splints without reference to the design of the hydrostatic system as a whole.

The allotted space does not permit a description of the manner in which building material is withdrawn from the streams by osmosis and other agencies and carried to seeds, growing tracts or storage organs. Such translocation is through very short distances and is powered by energy set free by respiration.

Source of Power Which Cause Movements of Sap

In further elucidation of the action of the leaf-pumps it is to be said that the ultimate source of the power which causes streaming movements is to be identified with the radiant energy of heat and light of rays of the sun. 98 per cent of the energy of the absorbed rays is utilized in the vaporization of water in the minute cups in moist walls of leaf-cells, thus operating the pumps which pull solutions through the conduits of the hydrostatic system. The power derived is sufficient to maintain a flow through a distance of a thousand feet of woody conduits either horizontally or vertically.

In actuality the system meets the safety requirements of mechanical engineering as a necessity lift of more than a third of this height is encountered in very few trees. Reliable estimates are to the effect that no known tree has ever reached a height of 400 feet.

It is to be emphasized that movement of sap is by a pull and not by pressure. The so-called root-pressures displayed by stumps and small plants is complicated by the action of the pneumatic system and by traumatic reactions eluding measurement in normal plants.

Transpiration from Leaf-Surfaces Causes Contraction or Shrinkage of Stems.

It has been shown in previous paragraphs that the sap and all of the liquids in leaves, stems, fruits, etc., are in a continuous meshwork of strands so thin that their outstanding property is that of cohesion. A pull on any part of the system is communicated to all parts of the plant. Loss of water as by transpiration from leaves reduces the volume of the water with a result similar to that which would be produced by strong suction applied to the water in a soft rubber tube or bulb.

Daily shrinkage of stems were observed and measured in 1871, but it was not until a continuous registration of shrinkage and subsequent swellings of stems and trunks that these variations could be connected with the rate of water-loss from the leaves.

It is commonplace knowledge that transpiration increases with sunrise; is accelerated by rising temperatures in the forenoon, and that the rate of water-loss is checked in midday by partial closure of the stomatal slits and further lessened by reduced radiation, falling tempera-

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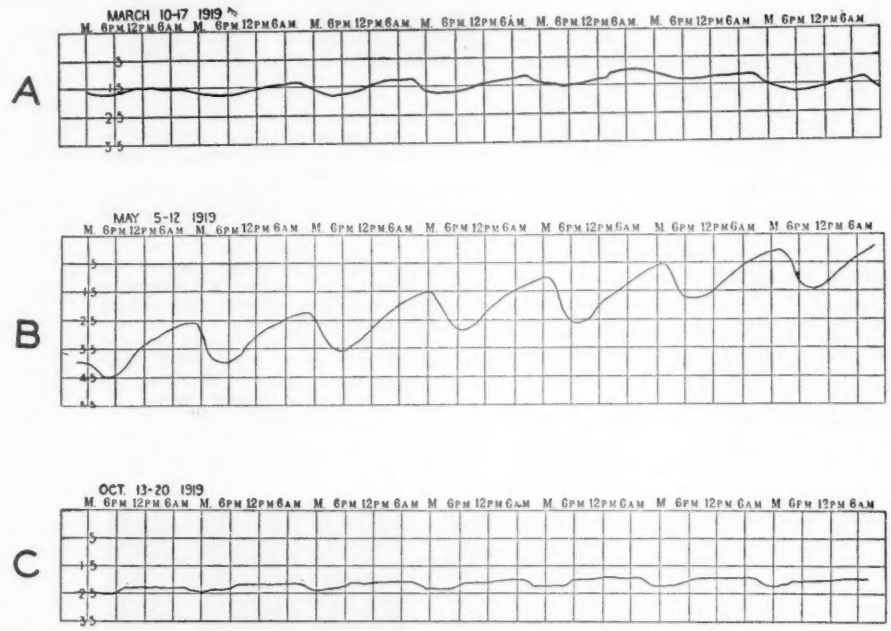
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Fig. 4. Dendrographic records of variations in thickness of the trunk of an Arizona ash. X 10. Spaces in the grid were originally 10mm sq. Each space carries a record for 6 hours.

Reductions in thickness beginning at sunrise with increased transpiration and continuing for 4-6 hours are registered. Such shrinkages are attributable to partial collapse of soft cells of phloem, cambium and wood. Recovery may begin after midday with relaxing tensions in and repletion of cell-liquids by osmosis, which restore original dimensions before sunrise.

A. Daily variations March 10-17: Minimum transpiration from unopened leaf-buds and developing inflorescences. Slight upward course of tracing denotes beginning growth in cambium.

B. Record for May 5-12. Temperature at maximum with consequent high rate of transpiration, maximum tensions in sap and high rate of growth. An increase of 4mm in diameter in the week was registered.

C. Record for Oct. 13-20. Diametral increase nearing a seasonal end with erratic daily variations supposedly caused by irregular transpiration accompanying development of abscission layers in petioles and to closing stages of maturation of the phloem. (Adapted from figs. 12 and 13, MacDougal Growth in Trees. Publ. 307. Carnegie Inst. of Washington. 1921).

The Arborists Clinic

QUESTION: How to stop slime flux on elm trees that have rods through them at the crotch?

Anon., NEW YORK.

ANSWER: Rods or bolts placed in American elm trees to provide support for branches can cause considerable bleeding and a chronic slime flux condition. Means of bracing with the least amount of injury are required. The idea of wrapping the branch with cable fastened to blocks of wood is good—all of the support is outside of the branch and in the wrapper. Iron screw rods with washer and nut at both ends of the hole through which the rod is inserted are also recommended. The washer and nut on both sides of the branch are countersunk below the bark; the wound is shellacked and painted with preservative and cemented. Active growth of bark should in time cover the filling around the rod. On small branches, lag screws smeared with beeswax and screwed into holes of smaller diameter bored into the branch at the point of support will insure a perfect seal. In addition, feed and water the tree if necessary to incite callus growth and to hasten healing.

Dr. E. F. Guba,
Massachusetts State College.

* * * *

QUESTION: Has anyone developed a good PRACTICAL and SIMPLE method of feeding trees other than the old punch hole system which goes back to the horse and buggy days?

J. E. Bixler,
Massachusetts.

ANSWER: The answer is, yes. Refer to the article in the last issue of Trees Magazine Vol. 6, No. 6, by August P. Bielman, "The Liquid Feeding of Trees". Also, in Vol. 6, No. 2, Trees Magazine, "Aeration of Tree Roots," by Charles F. Irish.

The Editor.

* * * *

QUESTION: What is the best method of preventing tree roots from raising walks, with injury to the trees?

Chas. P. McFarland,
Illinois.

ANSWER: Dunno any way of preventing this occurrence, unless it would be to plant at least eight feet from the walks, which, of course, is not practical!

Here in Lansing we have gone to some pains to work out a fairly satisfactory method of dealing with the walk-root proposition by root pruning and walk replacement. The method is quite detailed and cannot be covered here. To get the dope on our system, with five photos, please write to Editor Paul Tilford of the Arborists' News and ask him for a copy of the News of May, 1945. This issue contains a complete description, and the policy of application, costs, etc.

Carl Fenner
City Forester, Lansing, Mich.

* * * *

QUESTION: Would like to see legislation or some control over people running around, representing themselves as experts on everything pertaining to horticulture. These novices sure make an estate look like the day after.

C. R. Bechtle,
Bechtle Nursery Co,
Iowa.

ANSWER: There is a law in New Jersey that, so far, has operated satisfactorily. Phil Alden is conducting a survey to determine other states that have laws pertaining to horticulture. When he has finished it we shall run it in the Arborists Clinic.

The Editor.

QUESTION: Name the Diseases of Maple Trees.

I. R. Riker, New Jersey.

ANSWER: In answer to Mr. Riker's request, "Name the diseases of maple trees," a partial list of the diseases of maple follows together with a statement of cause. For convenience the diseases have been roughly grouped according to the most probable place of attack. All of the parasites named are fungi except where noted.

BARK

Oil injury—Maple, especially the sugar maple, is prone to injury by oil sprays.

Sun scald—Sudden exposure to sunlight by removal of companion trees, excessive pruning, or ice breakage may cause serious sun scald of maples.

BRANCH

Cytospora canker—Cytospora chrysosperma—This fungus is generally severe only on weakened material. The trunk may also be attacked.

Glaze damage—Heavy accumulation of ice injures many maples, especially the silver maple. The sugar maple does not recover readily after serious ice breakage.

Hymenochaete canker—Hymenochaeta agglutinans—Only slight damage is caused by this fungus. It binds together small branches and twigs and produces cankers of the branches.

Mistletoe, Phoradendron flavescens, a green parasite plant that sometimes damages maple.

Fruiting bodies of the fungus Polyporus lucidus on red maple.

LEAF

Anthracnose, Gloeosporium apocryptum.

Black mold, Fumago vagans. Secondary after insect attack.

Leaf blister—Several species of *Taphrina.*

Leaf scorch—Inability of roots to keep pace with the water requirements of the leaves.

Leaf spot—Phyllosticta minima. Several species of *Septoria.*

Powdery mildew—Unicinula circinata, Phyllactinia corylea.

Specked tar spot—Rhytisma punctatum.

Tar spot—Rhytisma acerinum.

White mold—Cristulariella depraedans.

ROOT

Daldinia root rot—Daldinia concentrica—Of minor importance.

Shoestring root rot—Armillaria mellea. This fungus is usually secondary following injury from other causes. It also frequently involves the root collar.

Xylaria root rot—Xylaria polymorpha. Of minor importance.

ROOT CROWN

Basal canker—Phytophthora cambivora.

VASCULAR SYSTEM

Wilt—Verticillium sp. This fungus disease is of great importance to arborists and of little importance to the forester.

TRUNK

Bleeding canker—Phytophthora cactorum.

Burls and galls—Cause unknown.

Daedalea canker—Daedalea unicolor. This fungus is capable of producing extended cankers as well as causing the decay listed under "White spongy rot."

Eutypella canker—Entypella parasitica. A disease of importance.

Nectria canker—Nectria galligena. A major disease from the standpoint of both the forester and the arborist.

Nectria dieback—Nectria cinnabarina. Often secondary following drought, winter injury, or suppression.

Sapstreak—Strain of Endoconidiophora virescens. For an account of this newly-described disease of sugar maple in forest stands of North Carolina see *Hepting, G. H.* Phytopathology 34: pp. 1069-1076. 1944.

Slime flux—Cause unknown, but probably related to bacterial infection as has been reported by J. C. Carter for wetwood of elms in Illinois.

Strumella canker—Strumella coryneoidea. Occurs on maple but is of little importance on this host.

Ustulina canker—Ustulina vulgaris. This fungus causes flattened cankers as well as the decay listed under "Butt rot." This is a disease of great importance to both the forester and the arborist.

BUTT ROTS

White mottled butt rot—*Fomes applanatus.*

White spongy butt rot—*Ustulina vulgaris.*

TRUNK ROTS

Brown cubical trunk rot—*Polyporus sulphureus.*

Brown mottled trunk rot—*Pholiota squarrosoides Pholiota adiposa.*

White flaky trunk rot—*Pleurotus ostreatus.*

White spongy trunk rot—*Daedalea unicolor, Fomes connatus, Fomes igniarius, Hydnum septentrionale, Polyporus glomeratus.*

White strand trunk rot—*Polyporus equamosus.*

WOUND PARASITES

Polyporus pargamenus and *P. versicolor* are among the most common fungi occurring on wounds, but they are rarely parasitic. They may occur on any woody part.

Polyporus lucidus (*Ganoderma sessile*)—Occurs frequently, especially on street trees. Its attack is usually at the base of the trunk.

Volvaria bombycina—The silky Volvaria is one of the most conspicuous and interesting of the numerous fungi that infect wounds of maple. Usually it is seen fruiting as a solitary toadstool on pruning wounds or defective crotches about 10 or 12 feet from the ground.

Rush P. Marshall,
Forest Pathologist, U. S. D. A.
New Haven, Conn.

QUESTION: How about a little argument on some of the new spray appliances?

G. R. Bussell, Penna.

ANSWER: This we shall have for you in a spring issue.

The Editor.

(Please Turn Page)

QUESTION: The clientele being bird-lovers, however, how does one get rid of birds flocking in trees in enormous groups over sidewalks?

A. E. Price, Ill.

ANSWER: Write to Bill Jonson, Destruxol Corp., Arroyo Seco. Pkwy., Pasadena, Calif., for his remarks on a product "Birds-Off." This year the Cleveland Park Department used it to keep pigeons out of insignia beds on the Public Square and they report it is the first time the plants have ever made a beautiful showing, because the pigeons refused to swarm through the beds after they had been sprayed.

* * *

QUESTION: Here in our section of Ohio Phloem necrosis is destroying most of our American Elms. What varieties of shade trees would you recommend to replace the Elms as street trees?

T. B. Kyle, Tipp. City, Ohio.

ANSWER: This is a serious subject and one we intend to discuss fully or at length in the 1947 issues of Trees Magazine. The trees used on American streets have for too long been confined to a few species. The fallacy of this practice is visible to all who wish to see, e. g. Columbus and Philadelphia. New species must be tried and these will be the subjects of 1947 articles.

The Editor.

* * * *

QUESTION: What progress has been made with the use of DDT in the control of the Dutch Elm Disease?

Joseph A. Dietrich,
Supt. Parks and Trees,
Greenwich, Conn.

ANSWER: We are actually working to determine the possibilities of DDT in the control of Dutch elm disease. Since the prime vector is the smaller European elm bark beetle, *Scolytus multistriatns,* most of our work thus far has been pointed toward control of that species by the use of DDT. Work is now under way with another vector *Hylurgopinus rufipes,* the native elm bark beetle.

Research has not reached a point where we can recommend the use of DDT generally.

D. E. Parker, U. S. D. A.
Senior Entomologist in Charge,
Columbus, Ohio

* * * *

QUESTION: What are the best varieties of trees for use as street trees in New England cities? Our elms, at the present rate, will be eliminated in 5 to 6 years hence.

George A. Mallett, Bridgeport, Conn.

ANSWER: This is another question that we hope will be answered in the articles to be published in Trees Magazine in 1947.

There is a strong feeling for native trees, but in the past ten years one very important exotic, the oriental plane, has fallen down in Philadelphia and other parts of the east. In the midwest our finest native, the American elm, is going fast in certain parts of the various states.

We hope you readers will write in your thoughts on this serious situation and suggest species that to date have not been tried as they should have.

The Editor.

* * * *

QUESTION: What is the U. S. Government going to do about the Dutch Elm Disease, now that the war is over and we have more help than before?

J. M. Fennell,
Bridgeport, Conn.

The present Federal program of work against the Dutch elm disease involves the following steps:

1. Scouting in areas where the disease has not been found or is not known to exist but where it may be expected to occur, and encouraging State and other agencies and individuals to remove and destroy the hazardous material found.
2. Enforcing a quarantine designed to prevent or retard spread of the disease.
3. Operating a laboratory for the identification of the organism causing the disease.
4. Conducting, in cooperation with research workers, a small series of experimental plots aimed at testing the possibilities of local control and at determining the history of the development of the disease in small centers.

At present there does not seem to be any definite reason to expect an increase in either the kind or the amount of work to be conducted by the Federal Government against the Dutch elm disease.

E. G. Brewer, U. S. D. A.,
Bureau Ent. & Plant Quarantus,
East Orange, N. J.

Deer hunting is hard work, but fighting a forest fire is a lot harder. Help prevent fires.

Opportunity for Arborists

Word comes to TREES that the National Park Service will shortly reactivate on a permanent basis its Mobile Tree Preservation Crew. For several years before the war the National Park Service was making substantial progress toward placing in good condition the thousands of valuable shade trees under its jurisdiction. During the war years, arboricultural work was necessarily closed down and, as a consequence, an enormous amount of tree preservation work is needed by the trees in the national historical and military parks, monuments and cemeteries in the East. Equipped to do any kind of arboricultural work, this five-man crew will work in the north during the summer and drift south to more equable climes when the wintry breezes blow. Although headquartered in Richmond, Va., the crew will be in a constant travel status, with stops of a week to a month, depending upon the needs of the various areas, where work is to be performed.

Applications will be considered from qualified arborists in three grades. The supervisory job (Assistant Arborist, P&S-2) will go to the best qualified applicant who has had training equivalent to that represented by graduation from a recognized forestry college, with major work in city or park forestry, and supplemented by several years of practical arboricultural work. Assisting him will be four tree workers, 2 SP-6 and 2 SP-5 grade. Applicants will be selected according to training and experience, and the preference which is prescribed by law will be given to qualified veterans.

Salary ranges are as follows: P&S-2, $3,396.20 to $4.149.60; SP-6, $2,644.80 to $3,397.20; SP-5, $2,394 to $2,845.44. Periodic promotions, a 40-hour 5-day week, per diem expense allowance, retirement benefits, employee compensation for accidents, and a chance for civil service status offer an attractive career to successful appliants.

If interested, write immediately to the Director, National Park Service, Merchandise Mart, Chicago 54, Illinois, giving age, marital status, education, training and experience. Successful applicants will be required to pass a physical examination and give satisfactory references as to experience and ability.

A Douglas fir recently felled had grown an average of 106 board feet of wood each year for many years, until maturity slower its growth rate.

Forest management, which permits continued timber crops, was first reported in America in 1730, but only in the past few decades has it become widespread.

Logging trees charred by a 1902 forest fire, Washington loggers found 5 million feet of timber still in merchantable condition.

Dr. Laurie Cox On Park Design

In teaching park design and administration, he has always sought to emphasize the vital necessity of providing in all important park areas those passive forms of recreation that relate to relaxation of the mind and spiritual uplift and which come from contact with natural scenery so often overlooked in favor of the more popular forms of active recreation.

Experience shows that when a city dweller suffers a nervous breakdown, one of the essential cures is to abandon artificial forms of urban life in which he has been living and spend considerable time in a wild forest or other natural scenic environment.

As to the necessary amount of park land which any urban region should possess, Dr. Cox says that much thought has been given to this problem and research is still going on. His studies show that it may be very definitely stated that few cities or urban regions of today possess sufficient park areas and that there is a growing need for more naturalistic parks and recreation forest areas. The city or metropolitan region, in order to meet adequately the demands for essential park service, should possess at least an acre of park land for every one hundred population.

Wm. Solotaroff

(Continued from Page 6)

The money from this source is reinvested in other plantings. The average assessment is $5.00. This covers once for all the entire cost. If the tree dies, it is replaced under guarantee without extra charge to the property.

The City of Newark led the way; appointed a shade tree commission January 1, 1904, after preliminary discussion in the press, and with the endorsement of the Board of Trade and the Lawyers' Club. The Newark commissioners made an initial planting around Military Park in the Spring of 1904 which was much publicized in the Newark Evening News which has a large circulation in East Orange. Then, following suit, East Orange, which adjoins Newark, appointed its commission in the Fall of 1904 and began to plan for the Fall planting program of that year. William Solotaroff was its first executive.

In the next ten years some thirty commissions were organized in New Jersey. At the last count, before the war, we had 125 commissions functioning in as many communities. The next phase was the enactment of a similar statute in Pennsylvania through the initiative of J. Horace McFarland. Pennsylvania also had 125 commissions at the last count some years before the war.

East Orange is a suburban community that lives by its beauty. In 1904 even more than today it was an airy bedroom for the commuters who traveled to Newark or to New York daily on the 8:10 and returned to their tree-embowered homes at 5:47. The problem of the industrial city with its soot and dust and smoke was not in their experience.

A very fine group of civic-minded citizens—leaders of the bar, education and business—served as the first Shade Tree Commissioners: Messrs. Ellis A. Apgar, Alfred P. Boller, and Joseph Lee; Messrs. Edward M. Colie and Edward O. Stanley served successively after Prof. Apgar's death. At first Solotaroff was the faithful Boswell of the commission. The legal counsel of Edward M. Colie —the interpretations of the powers conferred by the statute, and the ordinance which he compiled—together with the botanical knowledge of Professor Apgar, accumulated in a lifetime study of botany, were gathered up in Solotaroff's writings and helped much in promoting a knowledge of good tree administration.

The work of the East Orange Tree Commission was done on a high plane. Solotaroff was a man of many parts. Born in Russia, he came to this country at the age of seven. He had the Bachellor of Science degree of the City College of New York and carried the Phi Beta Kappa key of that distinguished fellowship. He was well-grounded in botany and entomology. He was also a good photographer and prepared the slides for his own lectures which led his hearers deeply into the storybook of Nature. His annual reports to the Mayor were enlivened with his choice photographs. His commission enlisted the cooperation of the Board of Education and gave him an opportunity to address the schools and interest the youth of the city in its beautification program. The children in turn carried the messages to their homes. Thus the gospel of tree-shaded streets was implanted in the hearts of the citizens by the spoken and printed word as well as by the eloquence of the tree-lined streets.

Solotaroff also contributed articles on various aspects of trees to Newark and New York newspapers; he published a text-book on the subject which is in use in some of the colleges of the country. This book, "Shade Trees in Towns and Cities; their selection, planting and care, as applied to the art of street decoration; their diseases and remedies through municipal supervision," (Publisher Wiley) was the first book by an American author on this subject so far as I have been able to learn.

An interesting fact about the development of Shade Tree work in the adjoining cities of Newark and East Orance is that many of the promotional and educational features of the program in the two communities were closely parallel but developed entirely independently. The writer of this article has been the superintendent of the Newark Shade Tree Commission since 1905 and confesses that he has learned of many of the similarities of projects and methods only since he undertook to collect the material for this article. Newark and East Orange worked independently and their problems were naturally very different, but they had similar ideals and achieved similar results.

A few remarks about Professor Apgar may be of interest. It was originally on his initiative that the Commission was appointed. He had been a distinguished educator, Professor of Botany at Trenton Normal College. When he hove in sight of fourscore years he needed an outlet for his leisure time and chose to invest his energies in a lasting service for his home town. For the first two years of Solotaroff's incumbency as Superintendent, he had the daily assistance of Professor Apgar who was the President of the Shade Tree Commission. Whenever they had a new problem dur-

(Continued on Page 18)

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Sap Movement

(Continued from Page 10)

tures and greater relative humidity in the late afternoon. (These reactions are reversed in cacti).

A striking parallelism between the above facts and the daily reversible variations of diameter of trunks and stems makes it possible to establish a casual connection. Abrupt acceleration of transpiration at dawn is coincidental with an equally abrupt loss in diameter which continues until midday or later, a period of 4 to 6 hours (See Figs. 3 and 4). With lessening tension or pull on the threads of water in the conduits, their walls slowly return to their original position; living cells from which some water has been withdrawn by osmosis regain liquid by the comparatively slow action of osmosis. Complete restoration of thickness and volume may not be accomplished until near dawn of the following day, when the daily course of changes follows. New cells produced by cambial activity will have been distended so that a permanently increased diameter may be registered at sunrise.

Two incidents illustrative of the reactions of a cohesive system of water in large trunks may be profitably cited. In one case a coast redwood 125 feet in height and 40 inches in diameter D.B.H., standing in a deep canyon so that the direct rays of the sun did not strike the crown until an hour after sunrise, was seen to show a positive shrinkage in the basal region within a few minutes after illumination; a reaction which was observed many times during the 10 year period over which a dendrograph was kept in operation.

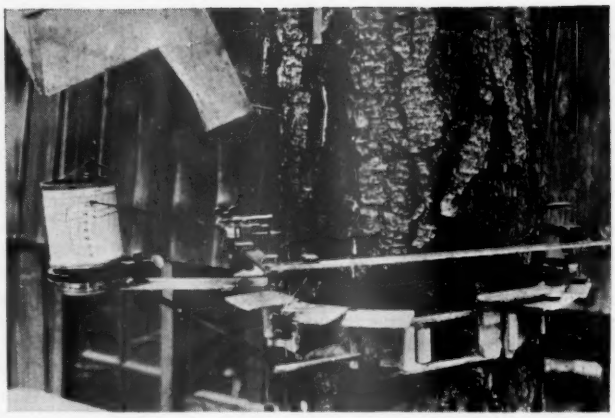

Fig. 3. Dendrograph attached to trunk of Monterey pine No. 44. A continuous record beginning in 1933 has been made. The pen is seen to be completing the record for the third week of May, 1946. Cambium action began the first week of Feb., with an increase in diameter of 1.5mm during the month. Increments of 1.5mm in March, 3.7mm in April and 3.7mm in May were registered. Amplitude of daily variation during these four months was small as a result of cloudiness and low temperatures. (See Fig. 4 for records of extreme variations).

The record of Monterey pine No. 1 includes observations in greater detail. Dendrographs were attached to the trunk 25 and 5 feet above the base and dendrometers were put in place at four points on a large root extending 93 feet from the base of the trunk. The dendrographic records were continuous for 25 years. An observer noting incipient shrinkage at the upper level on the trunk would see a simultaneous record 20 feet lower and would find registration of shrinkages by all instruments attached to the root. It was communicated immediately through the cohesive threads of the hydrostatic system to conduits in the soft tissues of the roots about 180 feet distant.

The foregoing discusssion of the movements of sap and all liquids in trees is based upon the results of anatomical studies, identification of the course of streaming movements carrying dyes, and isotopes, chemical analyses of soil solutions and of contents of conduits in the wood, bast and leaf-cells, identification of the course of transpiration and corresponding variations in stems and trunks with a wide variety of dissection and surgical experiments. No problem in plant physiology has required a wider range of studies for elucidation than that of the mechanism of sap flow.

Farrens

(Continued from Page 7)

fice and Executive Secretary can help the members are:

1. Ideas about methods, selling, rates, costs, new devices business methods, accounting, work forms, etc. which any member is willing to give to the group can be tabulated and reported periodically.

2. A library and file set up to collect and make available to members the vast amount of information now scattered in various books, government and university bulletins, magazines and Shade Tree Conference Proceedings on trees and tree work.

3. To assist members in the exchange of good men.

4. To set up a file similar to F.B.I. records on unscrupulous quacks in tree work to assist members and their clients in avoiding employing or being taken advantage of by these tree criminals. It is highly possible that many individuals would make a big effort to get off or stay off a nationally recognized "blacklist".

5. Assisting members in securing the best materials and equipment at the most favorable prices.

6. Advice to a member having trouble making his business pay by pointing out methods in use by more successful operators.

7. Information on new laws, regulations and conditions pertaining to tree work.

8. Giving support or opposition to new legislation.

9. In developing advertising material and publicity ideas for both local and national use.

10. In representing the Association at various meetings.

11. Encouraging the training of arborists and assist members in setting up veterans' training programs.

Commercial tree men who have operated their present business at least three years and can provide satisfactory references with evidence of high work standards are eligible for membership. Efforts to avoid or eliminate incompetent and unscrupulous members will always be made. Membership in the National Arborist Association is, and will be, restricted to men of character who stand for fair dealing and skillful, honest work.

* * * *

Add to new uses of wood—small wedges for propping wobbly legs on restaurant tables. A genius who devised them says they keep him from running out of paper match folders.

The Army saves 250,000 board feet of lumber per 100 miles by using square telephone poles. It's not true that Government efficiency men are trying to grow square trees.

Wildlife experts say the deer bot fly, which travels at 818 miles an hour, is the world's fastest creature. Our money goes on most any logger when the cook bangs that gut hammer.

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Special features in the design of the Mall Pneumatic Chain Saw make it especially adaptable for difficult tree cutting jobs. It requires little clearance in operation—cuts stumps within 2 inches of the ground. Its guide plate and cutting chain can be used at any angle—upside down or right side up. Its powerful rotary type air motor has an automatic oiler . . . the exhaust keeps the cutting plate free from dirt. It can be adapted for underwater work. Immediately available in 24, 36 and 48-inch cutting capacities.

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** This remarkable performance is recorded in Ross McIntyre's article "The Chain Saw Takes To The Air," Trees, October, 1946.*

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Budded Elms for Street Use

By Griggs Waring,
City Forester, Milwaukee, Wis.

Few things add more to local pride and city welfare than beautiful street trees. The most important part of shade tree planting is selecting of proper varieties. A street of mature trees looks very different than one of young saplings, so it is important to select young trees of a suitable kind, space them properly and give them the necessary care to make a beautiful street possible.

An ideal street should be so planted that looking down, we observe one variety throughout the entire length and about the same size. The distance between them should be uniform with enough intervening space so that their out-laying branches will not meet but will leave enough space for light and free circulation of air.

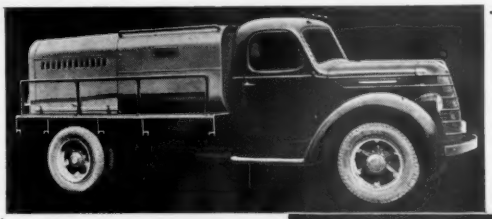
The system of branching should be borne in mind so as to prepare for a well-developed crown that will have a uniform contour in its general outline. Trees so cared for present a pleasing aspect at all times of the year when the trees are bare of foliage as well as when they are in leaf.

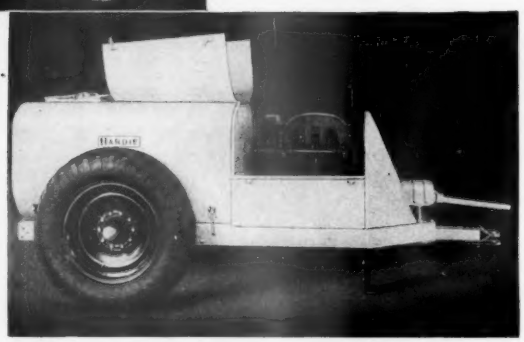
From a natural point of view, every tree is more or less interesting. Street trees, however, must be considered for their adaptability; certain character must be possessed by a tree to make it desirable for street planting. Trees for street planting should be hardy and capable of withstanding the hardships of city life, such as poor soil, soot, smoke, heat, drought and dust. Trees on streets are also subjected to severe tests in bad storms and should have their branch system developed to withstand winds, heavy sleet and snow.

Trees that retain their leaves in good condition throughout the summer and show changes of color in autumn, are the most desired. Trees on the street should be long-lived. Very few species answer the requirements however, Though we have some 500 or 600 native species, few are adapted to street planting. Among those which may be considered for street planting are the Norway Maple (exotic), Sugar Maple, Red Maple, Pin Oak, Linden, Elm, Ash and Hackberry.

In Milwaukee we have held principally to grafted types of Elm, as this has proven the most hardy for this climate. We are using two varieties—the Moline Elm and Vase Shaped. Grafted or budded trees are undoubtedly the best for street planting, especially the Moline Elm. As the Elm, owing to the many peculiarities of its ancestors, varies more than any other shade tree, budding or grafting stock from symmetrical forms, enables us to obtain street trees of uniform character.

Since our department was started in 1918, we have planted in the neighborhood of 90,000 trees on Milwaukee streets and these are mostly of the budded Elm type. Trees are not alone planted for their beauty; they are also very important from a hygienic point of view. They are air purifiers giving off oxygen and absorbing obnoxious gasses. Estimating that we have approximately 200,000 trees in the tree borders throughout the city of Milwaukee, and placing an average value of $100 per tree, the appraised value amounts to $20,000,000. Surely it is worth while taking care of our street trees and planting new ones at every opportunity.





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City Arborist Column

We have been waiting to revive the City Arborists Column, and since the fine meeting of that section of the National Shade Tree Conference held in Boston, the resolve was greatly strengthened. An opportunity to exchange views and give out with some advice is presented in the following problem faced by Harry Turner at East Orange (the city where Wm. Solotaroff, "Famous Arborists Series," first gave street tree planting prominence in this country).

Activity is the only thing that will make this department of value to those engaged in municipal arboriculture thruout the country so we hope you will respond with replies to Harry's problem and data on problems you have met, and solved if such is the case.

Here is Harry's letter:

"In the course of conversation at Boston, I mentioned our Parkway planting project and would like to hear from other foresters and landscape men who have undertaken a similar project and what results they have had. We have a center strip of parkway 20 feet wide and running approximately 1,300 feet in length. The parkway in its entirety is almost a mile long, the largest part of it running through Bloomfield, our neighboring town. In this center parkway area, there are 66 trees and 76 bushes, a fine example of promiscuous planting done some 30 or 35 years ago. For example, there are five trees with the diameters DBH ranging from 10 inches to 18 inches within a radius of 20 feet. I would like to clear out this jungle and mess, put in a nice lawn and possibly plant some dogwood trees or some ornamental trees of that type. This would cut down on the maintenance of this Parkway considerably and our neighboring town, Bloomfield, would probably continue the project through their town and make it one of the beauty spots in the county.

I sent a letter to Red Jacobs asking him to give me as much information as he has available that would be of help to me in this work.

Some of the residents of the Fifth Ward where the parkway is located, presented a petition protesting the removal of the old trees and the plan for new planting. They presented this petition at the last meeting of our Common Council and have asked for a hearing before any action is taken by the commission. The commission will hold a public hearing sometime in October to listen to their objections and at that time I would like to show them what other towns and cities have accomplished, using as many pictures and photographs as I can possibly get. In other words, I have to sell them a bill of goods and swing them over to our way of thinking. I am sure many of the readers of Trees would be able to give me some valuable information that would help me put across our point at this hearing. Would it be possible for you to make my request known in your October issue of Trees? I would appreciate hearing from your readers.

Yours Very Truly,
Shade Tree Commission,
Harry E. Turner,
Secretary, Shade Tree Commission,
East Orange, N. J.

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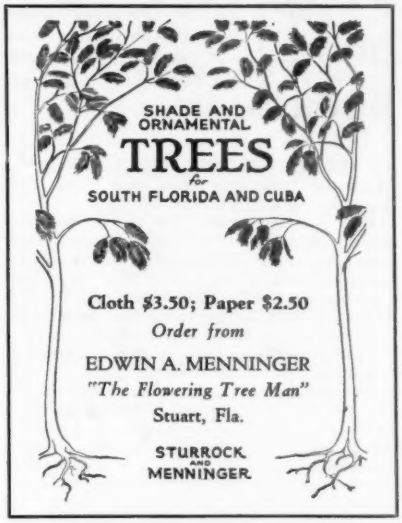

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Authors and Books

The following books may be ordered from TREES Magazine, 2478 Putnam St., Toledo 10, Ohio.

TREES IN BRITAIN, by L. J. F. Brimble. Macmillan and Co., Ltd., New York and London. 350 pgs. illus. $4.50.

This is a delightful book for the tree romancer and one who revels in historical data pertaining to the introduction to modern civilization of the various species. The many fine drawings and photographs that illustrate Mr. Brimble's work are splendid and help much to evaluate tree growth in Britain.

Unfortunately, so far as this reviewer is concerned, too little space is given to the many interesting and lovely horticultural varieties that must abound in British gardens and parks. This has been a phase of arboriculture the world over, that appears to have diminished seriously in the past twenty-five years. It would seem that a revival of interest could be effected in these numerous fine trees if a work were published bringing them graphically to the public eye.

It is always interesting to learn of how trees thrive in other parts of the world and in this volume the arborist and tree lover will find many hours of interesting reading. You should have this book in your tree section.

* * * *

THE GARDENER'S BUG BOOK, by Cynthia Westcott. Doubleday and Co., Inc., New York. 590 pgs. illus., 100 in full color. $4.95.

It is difficult to understand why this type of volume has not appeared many years ago, but maybe it is just as well that we have had to wait for Dr. Westcott to turn out this indispensable work.

The first part tells how to use the book. First if you know the common name of the bug, if not then by turning to the list of host plants. Other sections discuss spray mixtures, a history of harmful and benecial insects, types of spray applicators and insect orders.

Perhaps the outstanding features are the 100 color plates showing the various life stages of the insect and its work on the host plant. There are in addition about 100 line drawings which give additional clarity to the instructive text.

The completeness of the job done by Dr. Westcott is commendable. Plant enemies that attack flowers, trees, shrubs, lawns, vegetables and fruits are covered very thoroughly and for every section of the country. The book is equally valuable North, East, South and West.

Professional men can buy this book and have a "tool" they will have constant use for practically every day in the year. As the author says, she wanted a quick, ready bug reference on her desk for her daily work so she compiled this data. It will serve this purpose for anyone, amateur or professional, who has bug trouble, and who hasn't.

* * * *

SHADE AND ORNAMENTAL TREES FOR SOUTH FLORIDA AND CUBA, by David Sturrock and Edwin A. Menninger. Stuart Daily News, Inc., Stuart, Fla., 172 pgs., illus. Paper $2,50; Cloth $3.50.

First of all I'm going to "bawl" out my good friend the "flowering tree man" and co-author of this meaty book, Ed Menninger, for not doing a better print job. Paper is scarce, which may be his comeback, but a book as interesting and well written as this deserves better paper.

The cultural data on the many worthwhile species covered by the authors is explicit, somewhat of a rarity in most tree books. The little asides, that add so much to such discussions, are plentiful and make the book more valuable to writers, and as reference.

Some of the breakdowns that help in using these trees are: Evergreen foliage trees; Flowering trees; Dry land trees; Wet land trees; Windbreak trees; Salt tolerant trees, etc. The remainder of the book discloses the trees by family.

This is a book that will find many users as well as readers, and people with tree book sections in their libraries will find this an interesting and enjoyable addition.

* * * *

SOILS AND FERTILIZERS, by Firman E. Bear. John Wiley & Sons, New York. Third Edition, 374 pgs., illus. $3.75.

Intended primarily as an aid to students in following classroom work, a wealth of material is presented here on soils and their effect on the growth of crops. This has been for years an accepted top book on this subject and in this third edition has brought the material up to date. The horticulturist and arborist will obtain much valuable data altho the book is based primarily on agricultural practices.

* * * *

GENERAL HORTICULTURE, by Thomas J. Talbert. Lea & Febiger, Philadelphia, Pa. 452 pgs. illus. $4.00.

The author has attempted to cover a tremendous amount of space in this work with the result that a rather sketchy description of some valuable subject matter has resulted. However, a rather complete list of references after each chapter will enable the reader to obtain detailed information on subjects in which he may be interested.

SHRUBS AND TREES FOR THE SMALL PLACE, by P. J. Van Melle. Charles Scribner's Sons, New York. 298 pgs. $2.50.

Because this book is written by a nurseryman of many years experience it has much value to the worker with plants. The author confines his remarks to the territory adjacent to Boston and N. Y. and his observations on the vagaries of many plants is worth reading. A score chart which evaluates 363 shrubs and trees is an important feature of this fine record.

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Wm. Solotaroff

(Continued from Page 13)

ing those first two years Professor Apgar bestowed his counsel and experience. It was also his pleasure to inspect the streets that were in need of trees, to go to the nurseries to inspect the stock, to interview the officials of the city in order to create a perfect spirit of cooperation for the new department within the official family.

Two years of such tutelage were invaluable to Solotaroff. He devoted himself unstintingly to his task. In the first year of its history, the East Orange Shade Tree Commission planted 100 trees; in the third year, 1,000 were planted. Not yet satisfied with his professional background, Solotaroff went to Europe at his own expense to study tree administration in European cities. At first, perhaps, the protege of the chairman, he presently became the spearhead of a growing civic movement in his community whose end is not yet. The impress of a pioneer, William Solotaroff, is clearly traceable.

Extract from 1909 *East Orange Shade Tree Report:*

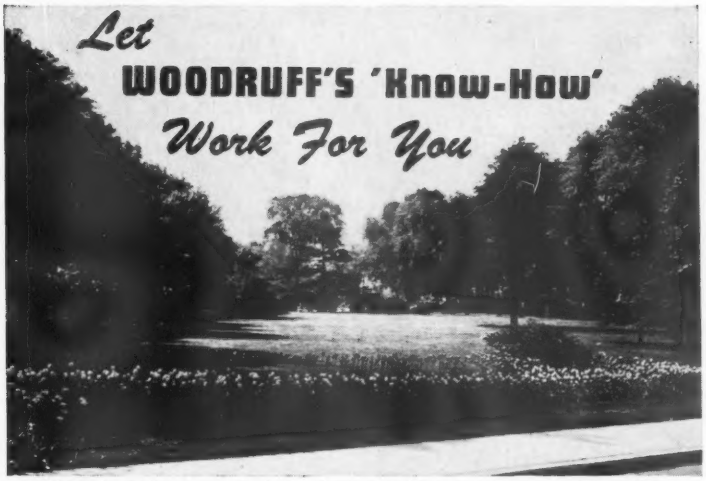
The sixth annual report of the East Orange Shade Tree Commission summarizes the species used from 1904 to 1909, inclusive.

Since its organization in 1904, it has planted 3,232 trees.

Table showing the number of trees planted by the Shade Tree Commission and species used:

Species.	Number.
Ash, white	32
Elm, American	12
Gingko	131
Linden, American	137
Linden, European	124
Maple, Norway	926
Maple, red	65
Maple, sugar	688
Oak, Pin	451
Oak, Red	234
Plane, Oriental	384
Poplar, Lombardy	48
	3,232

The total number of trees therefore over which the East Orange Shade Tree Commission now has jurisdiction is 10,-953 planted before the commission took over and 3,232 planted by the commission. A total of 14,185.



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